SECTION BR
BRAKE SYSTEM

CONTENTS

PRECAUTIONS 3
Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER” 3
Precautions for Brake System 3
PREPARATION 4
Commercial Service Tools 4
NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING 5
NVH Troubleshooting Chart 5
BRAKE PEDAL 6
Inspection and Adjustment 6
ADJUSTMENT 7
Removal and Installation 7
COMPONENTS 7
REMOVAL 8
INSPECTION AFTER REMOVAL 8
INSTALLATION 8
BRAKE FLUID 9
On-Board Inspection 9
CHECKING BRAKE FLUID LEVEL 9
Drain and Refill 9
Bleeding Brake System 10
BRAKE PIPING AND HOSE 11
Hydraulic Circuit 11
Removal and Installation of Front Brake Piping and Hose 12
REMOVAL 12
INSTALLATION 12
Removal and Installation of Rear Brake Piping and Hose 12
REMOVAL 12
INSTALLATION 12
Inspection after Installation 13
BRAKE MASTER CYLINDER 14
On-Board Inspection 14
LEAK INSPECTION 14
Removal and Installation 14
REMOVAL 14
INSTALLATION 14
Disassembly and Assembly 15
COMPONENTS 15
MODEL WITHOUT VDC 15
MODEL WITH VDC 17
BRAKE BOOSTER 21
On-Board Inspection and Service 21
OPERATION CHECK 21
AIR TIGHT CHECK 21
Removal and Installation 22
COMPONENTS 22
REMOVAL 22
INSPECTION AFTER REMOVAL 22
INSTALLATION 23
VACUUM LINES 24
Components 24
Removal and Installation 24
Inspection 24
VISUAL INSPECTION 24
CHECK VALVE INSPECTION 24
FRONT DISC BRAKE 25
On-Board Inspection 25
PAD WEAR INSPECTION 25
Components 25
Removal and Installation of Brake Pad 26
REMOVAL 26
INSTALLATION 26
Removal and Installation of Brake Caliper Assembly ... 26
REMOVAL 26
INSTALLATION 27
Disassembly and Assembly of Brake Caliper Assembly 27
DISASSEMBLY 27
INSPECTION AFTER DISASSEMBLY 28
ASSEMBLY 29
DISC ROTOR INSPECTION 30
BRAKE BURNISHING PROCEDURE 30
REAR DISC BRAKE 31
On-Board Inspection 31

PAD WEAR INSPECTION 31
Components 31
Removal and Installation of Brake Pad 32
REMOVAL 32
INSTALLATION 32
Removal and Installation of Brake Caliper Assembly 32
REMOVAL 32
INSTALLATION 33
Disassembly and Assembly of Brake Caliper Assembly 33
DISASSEMBLY 33
INSPECTION AFTER DISASSEMBLY 34
ASSEMBLY 34
DISC ROTOR INSPECTION 35
BRAKE BURNISHING PROCEDURE 36
SERVICE DATA AND SPECIFICATIONS (SDS) 37
General Specifications 37
Brake Pedal 37
Brake Booster 37
Check Valve 37
Front Disc Brake 37
Rear Disc Brake 38

PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

AFS002KF

The Supplemental Restraint System such as “AIR BAG” and “SEAT BELT PRE-TENSIONER”, used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

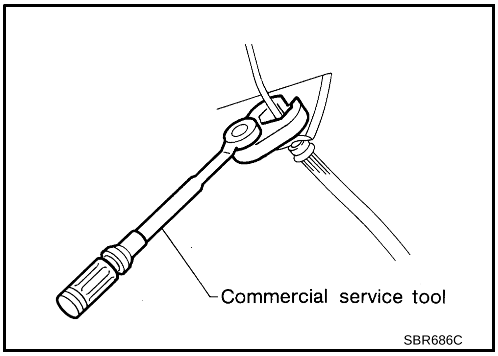
WARNING:

- **To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.**
- **Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.**
- **Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.**

Precautions for Brake System

AFS002KG

- Clean dust on front brake and rear brake with a vacuum dust collector. Do not blow with compressed air.
- Recommended fluid is brake fluid “DOT 3”.
- Do not reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.
- Use clean brake fluid, to clean or wash all parts of master cylinder and disc brake caliper,etc.
- Do not use mineral oils such as gasoline or kerosene. They will ruin rubber parts of the hydraulic system.
- Use flare nut torque wrench when removing and installing brake tube.
- When installing brake piping, be sure to check torque.
- Before working, turn ignition switch OFF and disconnect electrical connectors of ABS actuator and electric unit (control unit), VDC/TCS/ABS control unit or battery cable at negative terminal.
- Burnish the brake contact surfaces after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage. Refer to BR-30, "BRAKE BURNISHING PROCEDURE" (front disc brake), BR-36, "BRAKE BURNISHING PROCEDURE" (rear disc brake).



WARNING:

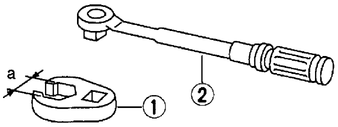
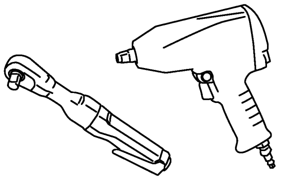
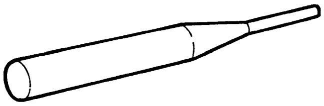
Clean brake pads and shoes with a waste cloth, then wipe with a dust collector.

PREPARATION

PFP:00002

Commercial Service Tools

AFS002KI

Tool name		Description
1.Flare nut crowfoot a:10 mm (0.39 in) / 12 mm (0.47 in) 2.Torque wrench	 NT360	Removing and installing each brake piping
Power tool	 PBIC0190E	Removing front and rear caliper assembly, tires
Pin punch Tip diameter:4 mm (0.16in)dia	 ZZA0515D	Removing and installing reservoir tank pin

NOISE, VIBRATION AND HARSHNESS (NVH) TROUBLESHOOTING

PFP:00003

NVH Troubleshooting Chart

AFS002PD

Use the chart below to help you find the cause of the symptom. If necessary, repair or replace these parts.

Reference page			BR-25, BR-31	BR-25, BR-31	BR-25, BR-31	—	—	BR-30, BR-35	—	—	—	BR-30, BR-35	—	NVH in PR section	NHV in RFD section	NVH in FAX, RAX and FSU, RSU section	NVH in WT section	NVH in WT section	NVH in RAX section	NVH in PS section
Possible cause and SUSPECTED PARTS			Pads - damaged	Pads - uneven wear	Shims damaged	Rotor imbalance	Rotor damage	Rotor runout	Rotor deformation	Rotor deflection	Rotor rust	Rotor thickness variation	Drum out of round	PROPELLER SHAFT	DIFFERENTIAL	AXLE AND SUSPENSION	TIRES	ROAD WHEEL	DRIVE SHAFT	STEERING
Symptom	BRAKE	Noise	×	×	×									×	×	×	×	×	×	×
		Shake				×								×		×	×	×	×	×
		Shimmy, Judder				×	×	×	×	×	×	×				×	×	×		×

×: Applicable

BRAKE PEDAL

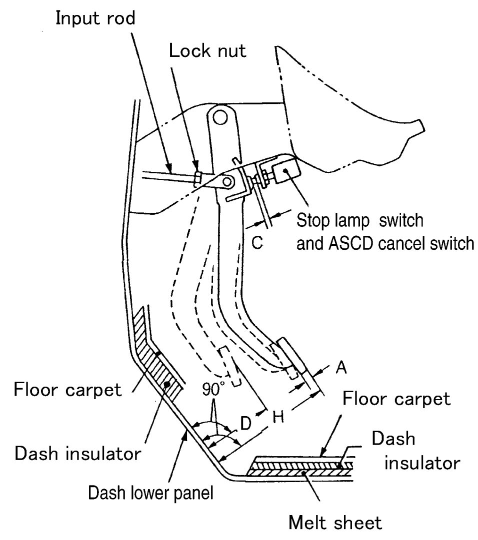
PFP:46501

Inspection and Adjustment

AFS002KK

Play and clearance inspection between brake pedal and floor panel with pedal depressed.

- Check brake pedal play.
- Check brake pedal height from dash lower panel.
- Adjust height referring to the following specifications.

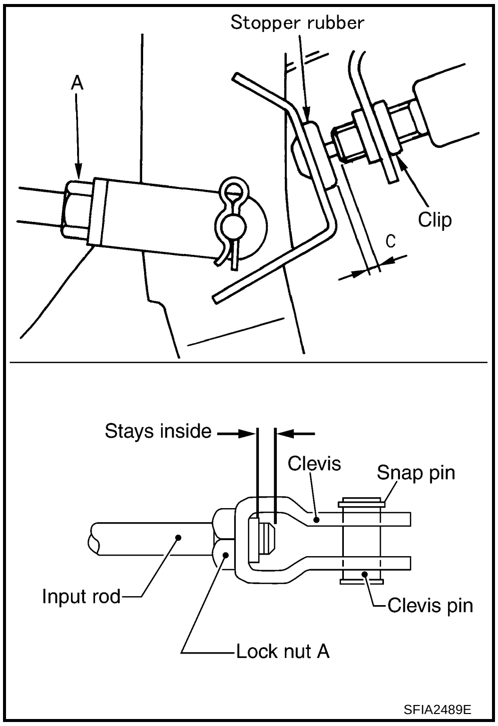


SFIA2380E

H	Brake pedal height (from dash lower panel top surface)	M/T model	156 – 166 mm (6.14 – 6.54 in)
		A/T model	164 – 174 mm (6.46 – 6.85 in)
D	Brake pedal depressed height [under a force of 490 N (50 kg, 110 lb) with engine running]	M/T model	80 mm (3.15 in) or more
		A/T model	85 mm (3.35 in) or more
C	Clearance between stopper rubber and threaded end of the stop lamp switch and ASCD cancel switch		0.74 – 1.96 mm (0.0291 – 0.0772 in)
A	Pedal play		3 – 11 mm (0.12 – 0.43 in)

ADJUSTMENT

1. Loosen stop lamp switch and ASCD cancel switch by turning it counterclockwise by 45°.
2. Loosen lock nut (A) on the input rod to rotate input rod for adjusting brake pedal height to the specified one, and tighten lock nut (A).
   Refer to brake pedal height BR-6, "Inspection and Adjustment" , specified torque BR-22, "COMPONENTS" .
   CAUTION:
   Make sure the threaded end of input rod stays inside clevis.
3. With the pedal pulled and held by hand, press stop lamp switch and ASCD cancel switch until its threaded end contacts stopper rubber.
4. With the threaded end of the stop lamp switch and ASCD cancel switch contacting the bracket, rotate the switch clockwise by 45° to secure.
   CAUTION:
   Make sure that the clearance (C) between bracket and end of stop lamp switch and ASCD cancel switch is within the standard. Refer to BR-6, "Inspection and Adjustment" .
5. Check pedal play.
   CAUTION:
   Make sure that stop lamps goes off when pedal is released.

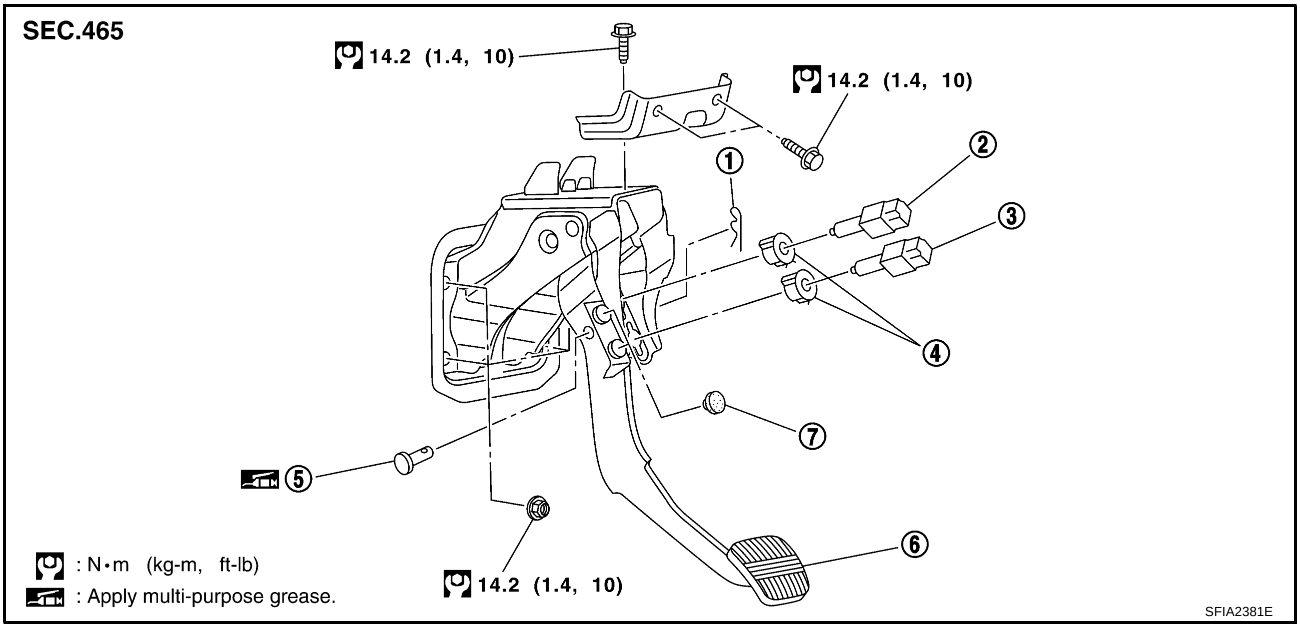


6. Start engine to check brake pedal depression height when depressed. Refer to BR-6, "Inspection and Adjustment" .

Removal and Installation

AFS002P8

COMPONENTS



1. Snap pin	2. Stop lamp switch	3. ASCD cancel switch
4. Clip	5. Clevis pin	6. Brake pedal assembly
7. Stopper rubber		

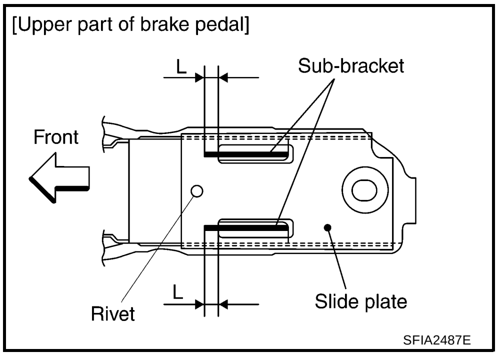
NOTE:
Clevis pin can be installed from both left and right.

REMOVAL

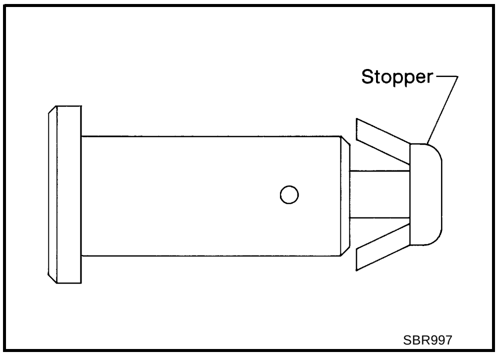
1. Remove instrument driver lower panel. Refer to IP-10, "INSTRUMENT PANEL ASSEMBLY" .
2. Remove steering column assembly from steering member. Refer to PS-12, "STEERING COLUMN" .
3. Remove stop lamp switch and ASCD cancel switch from brake pedal assembly.
4. Remove snap pin and clevis pin from clevis of brake booster.
5. Remove brake pedal assembly mounting nuts. Pull brake booster toward engine room to the extent that does not deform brake tube.
6. Remove brake booster clevis from input rod.
7. Remove mounting bolt and then remove brake pedal assembly from vehicle.

INSPECTION AFTER REMOVAL

- Check brake pedal upper rivet for deformation.
- Make sure that joint length (L) of sub-bracket and sliding plate is 4 mm (0.16 in) or more.
- Check brake pedal for bend, damage, and cracks on the welded parts.
- Replace brake pedal assembly if any non-standard condition is detected.



- Check clevis pin and plastic stopper for damage and deformation. Replace clevis pin if there are.



INSTALLATION

Install in the reverse order of the removal. Tightening torques for brake pedal assembly mounting nuts and bolt are referred to BR-7, "COMPONENTS" . Tightening torque for lock nut (A) is referred to BR-22, "COMPONENTS" .

- Adjust brake pedal height after installing brake pedal assembly to vehicle. Refer to BR-6, "Inspection and Adjustment" .

BRAKE FLUID

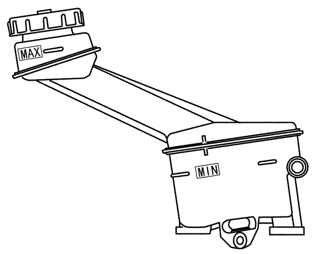
PFP:KN100

On-Board Inspection

AFS002KM

CHECKING BRAKE FLUID LEVEL

- Make sure that a brake fluid level in reservoir tank is within the standard (between MAX and MIN lines).
- Visually check around reservoir tank for fluid leakage.
- If the level is excessively low, check brake system for leakage.
- Release parking brake lever and see if brake warning lamp goes off. If not, check brake system for fluid leakage.



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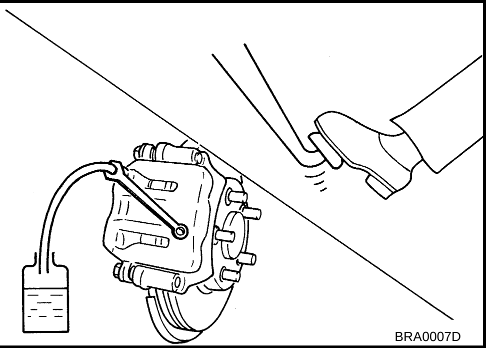
Drain and Refill

AFS002KN

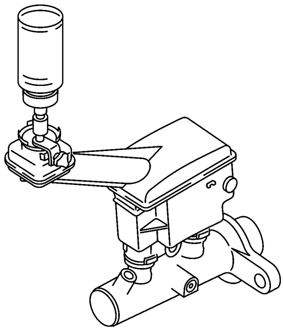
CAUTION:

- **Refill with new brake fluid "DOT 3".**
- **Do not reuse drained brake fluid.**
- **Do not let brake fluid splash on painted surfaces of body. This might damage paint, so when splashing it on the surfaces, immediately wipe off them and wash it away with water.**
- **Before servicing, disconnect electrical connectors of ABS actuator and electric unit (control unit), VDC/TCS/ABS control unit or battery cable at negative terminal.**

1. Connect a vinyl tube to bleed valve.
2. Depress brake pedal, loosen bleed valve, and gradually remove brake fluid.


BRA0007D

3. Clean inside of reservoir tank, and refill with new brake fluid.
4. Loosen bleed valve, depress brake pedal slowly to full stroke and then release it. Repeat the procedure every 2 or 3 seconds until the new brake fluid comes out, then close the bleed valve while depressing the pedal. Repeat the same work for each wheel.
5. Bleed air. Refer to BR-10, "Bleeding Brake System" .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A B C D E BR G H I J K L M

Bleeding Brake System

AFS002KO

CAUTION:

- **While bleeding, pay attention to master cylinder fluid level.**
- **Turn ignition switch OFF and disconnect electrical connectors of ABS actuator and electric unit (control unit), VDC/TCS/ABS control unit or battery cable at negative terminal before working.**

1. Connect a vinyl tube to rear right brake caliper bleed valve.
2. Fully depress brake pedal 4 or 5 times.
3. With brake pedal depressed, loosen bleed valve to bleed air in brake line, and then tighten it immediately.
4. Repeat steps 2 and 3 until all of the air is out of the brake line.
5. Tighten the bleed valve to the specified torque. Refer to front disc brake: BR-25, "Components" , rear disc brake: BR-31, "Components" .
6. From step 1 to 5, with master cylinder reservoir tank filled at least half way, bleed air from brake hydraulic line bleed valves in the following order:
   Rear right brake→Front left brake→Rear left brake→Front right brake

BRAKE PIPING AND HOSE

PFP:46210

Hydraulic Circuit

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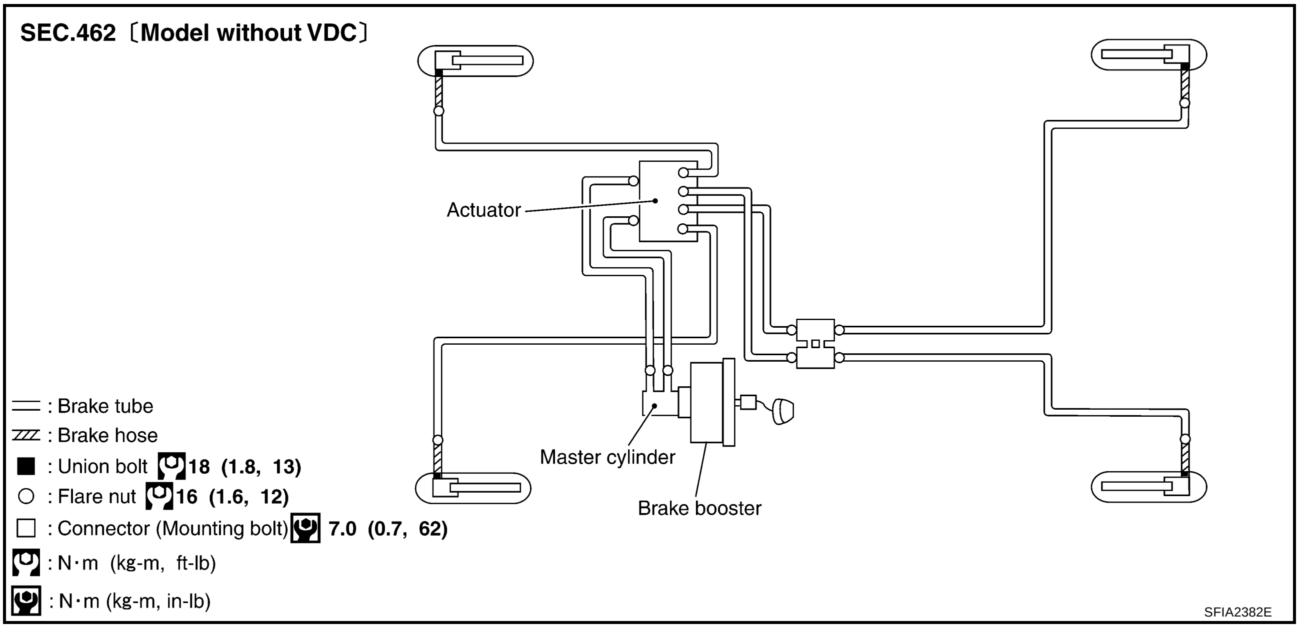
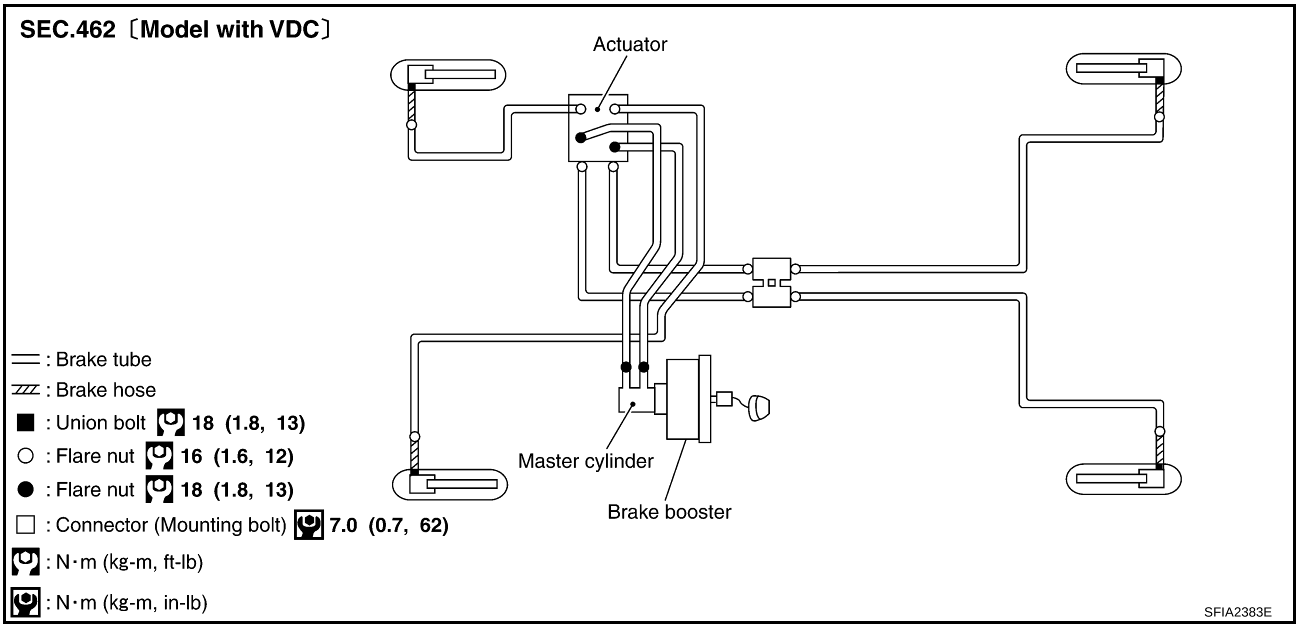




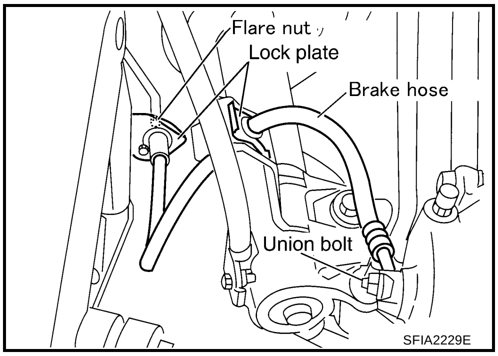
CAUTION:

- **All brake hoses and tubes must be free from excessive bending, twisting and pulling.**
- **Make sure that there is no interference with other parts when turning steering both clockwise and counterclockwise.**
- **Brake tubes and hoses are important safety parts. Always disassemble the parts and retighten their fittings, if a brake fluid leak is detected. Replace applicable part with a new one, if damaged part is detected.**
- **Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted surfaces of body, immediately wipe off them and wash it away with water immediately.**
- **Cover the open end of brake pipes and hoses when disconnecting to prevent entrance of dirt.**
- **Refill with new brake fluid “DOT 3”.**
- **Do not reuse drained brake fluid.**

Removal and Installation of Front Brake Piping and Hose

AFS002KQ

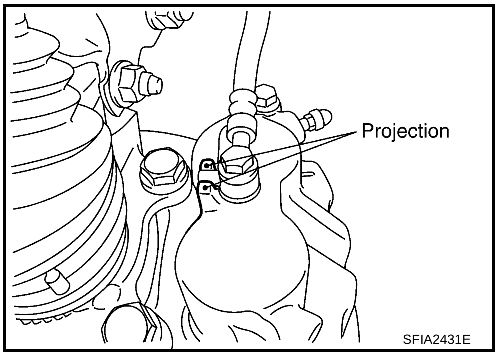
REMOVAL



SFIA2229E

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Disconnect brake hose from brake tube, using a flare nut wrench.
3. Remove union bolt, and then remove brake hose from brake caliper assembly.
4. Remove lock plate, and then disconnect brake hose from vehicle.

INSTALLATION



SFIA2431E

1. Install brake hose by aligning with the projections on brake caliper assembly, and tighten union bolt to the specified torque. Refer to BR-11, "Hydraulic Circuit" .

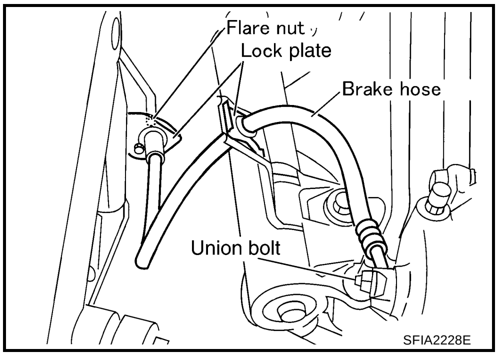
   CAUTION:

   Do not reuse copper washer.
2. Connect brake hose to brake tube. Temporarily tighten flare nut by hand as much as possible. Secure them to bracket with lock plate.
3. Tighten flare nut to the specified torque using a flare nut torque wrench. Refer to BR-11, "Hydraulic Circuit" .
4. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .
5. Check it after the installation. Refer to BR-13, "Inspection after Installation" .

Removal and Installation of Rear Brake Piping and Hose

AFS002KR

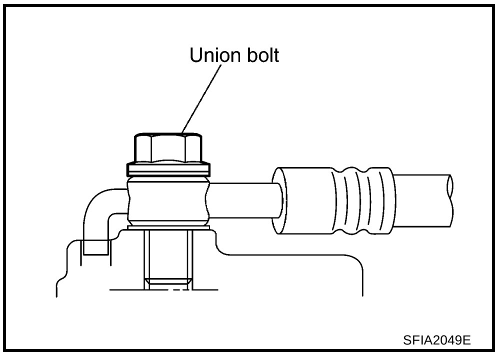
REMOVAL



SFIA2228E

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Using a flare nut wrench, disconnect brake hose from brake tube.
3. Remove union bolt, and then remove brake hose from brake caliper assembly.
4. Remove lock plate, and then disconnect brake hose from vehicle.

INSTALLATION



SFIA2049E

1. Attach L-shape metal fitting of the brake hose to brake caliper assembly positioning hole, and then tighten union bolt to the specified torque. Refer to BR-11, "Hydraulic Circuit" .

   CAUTION:

   Do not reuse the copper washer.
2. Install brake tube to brake hose after securing brake hose to vehicle using lock plate. Tighten flare nut to the specified torque after temporarily tightening them by hand using a flare nut torque wrench. Refer to BR-11, "Hydraulic Circuit" .
3. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .
4. Check it after the installation. Refer to BR-13, "Inspection after Installation" .

Inspection after Installation

AFS002KS

CAUTION:

Brake tubes and hoses are important safety parts. Always disassemble the parts and retighten their fittings, if a brake fluid leak is detected. Replace applicable part with a new one, if damaged part is detected.

1. Check brake hoses, brake tubes, and connections for fluid leakage, damage, twists, deformations, contacts with other parts, and loose connections.
2. While depressing brake pedal under a force of 785 N (80 kg, 177 lb) with engine running and keep it for about 5 seconds, then check each part for fluid leakage.

BRAKE MASTER CYLINDER

PFP:46010

On-Board Inspection

AFS002KT

LEAK INSPECTION

- Check for leaking in a master cylinder installation surface, a reservoir tank installation surface, and brake tube connections.

Removal and Installation

AFS002KU

CAUTION:

Be careful not to splash brake fluid on painted areas; it may cause paint damage. If brake fluid is splashed on painted areas, wash it away with water immediately.

REMOVAL

1. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
2. Disconnect brake fluid level switch harness connector.
3. Using a flare nut wrench, disconnect master cylinder brake tubes.
4. Remove master cylinder mounting nuts and remove master cylinder assembly from vehicle.

INSTALLATION

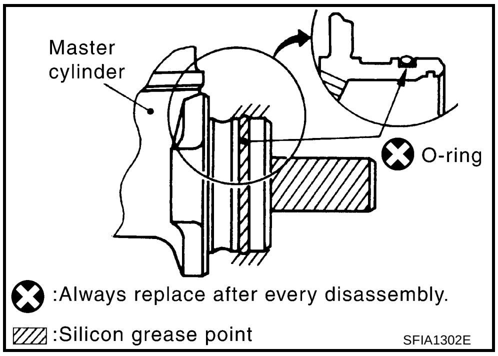
CAUTION:

- **Refill with new brake fluid “DOT 3”.**
- **Do not reuse drained brake fluid.**

1. Perform the following procedure for VDC models, install master cylinder assembly to brake booster assembly and tighten the nuts to the specified torque. Refer toBR-22, "COMPONENTS" .
   - Apply silicon grease in inner kit to O-ring and it's surrounding areas and to the booster side inner wall.

   CAUTION:

   - **Do not damage the sliding surface of the primary piston rod and do not allow foreign materials on it's surface.**
   - **Do not reuse O-ring.**



2. Install brake tube to master cylinder assembly and temporarily tighten flare nut by hand.
3. Tighten brake tube flare nut to the specified torque using a flare nut torque wrench. Refer to BR-11, "Hydraulic Circuit" .
4. Connect brake fluid level switch harness connector.
5. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .

Disassembly and Assembly

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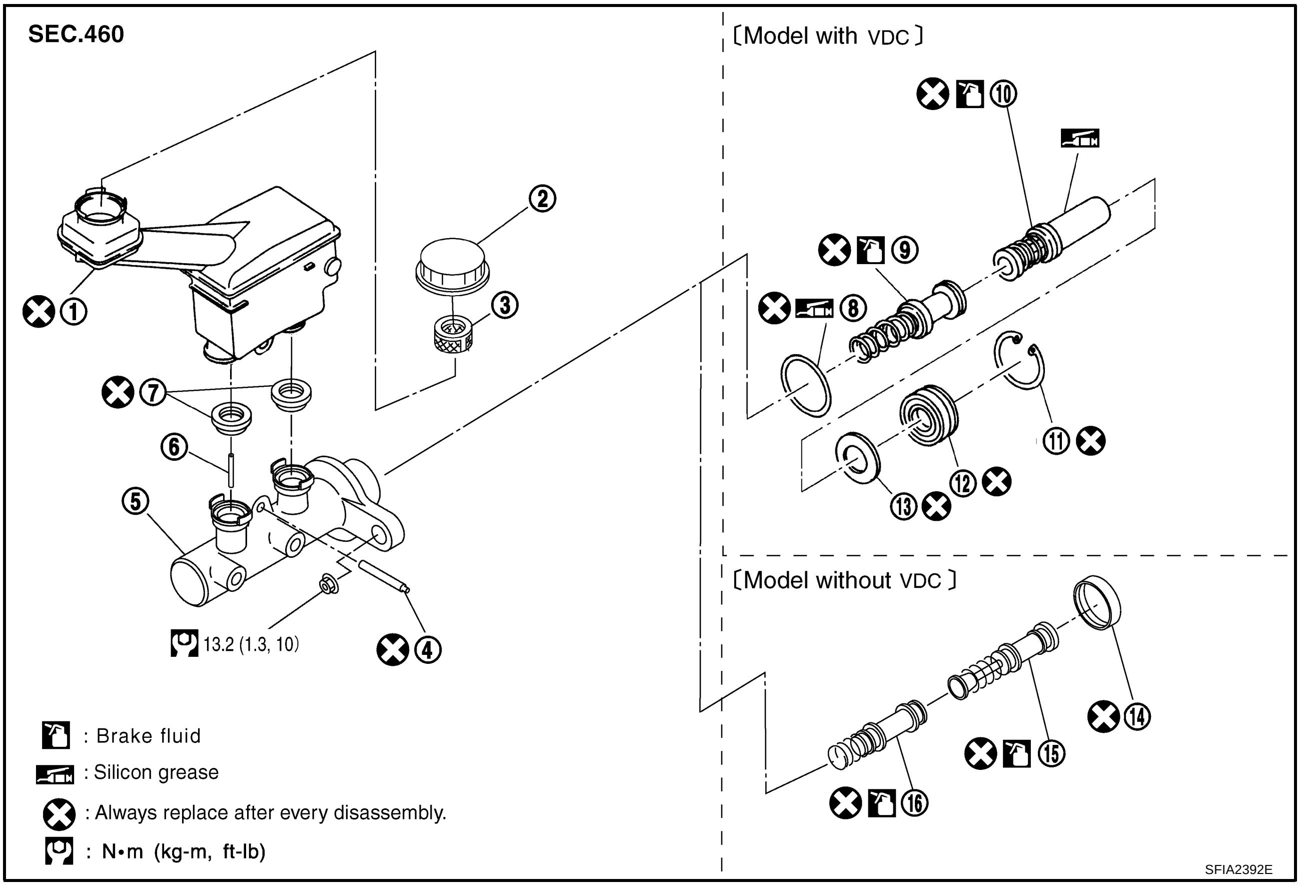
COMPONENTS



1.	Reservoir tank	2.	Reservoir cap	3.	Oil strainer
4.	Pin	5.	Cylinder body	6.	Piston stopper (models with VDC)
7.	Grommet	8.	O-ring	9.	Secondary piston assembly
10.	Primary piston assembly	11.	Snap ring	12.	Guide assembly
13.	Plate	14.	Stopper cap	15.	Primary piston assembly
16.	Secondary piston assembly				

MODEL WITHOUT VDC

CAUTION:

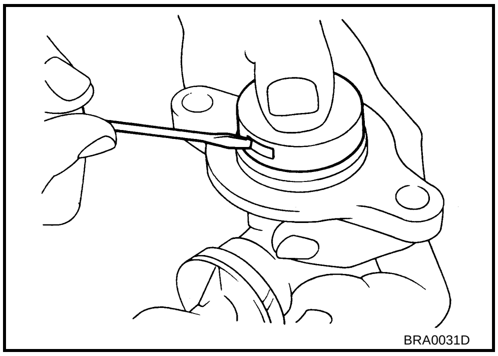
Remove reservoir tank only when absolutely necessary.

Disassembly (Piston Assembly)

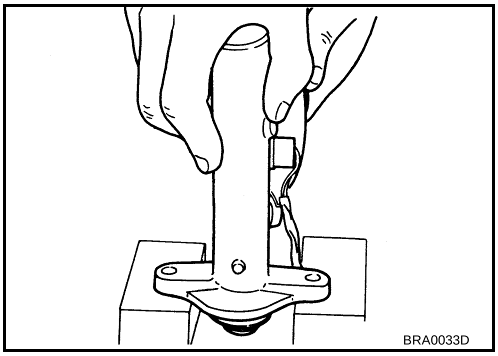
1. Using a flat-bladed screwdriver as shown in the figure, lift up the tabs on stopper cap and remove it from master cylinder.

   NOTE:

   Remove stopper cap while holding it because primary piston assembly in master cylinder may pop out.
2. Carefully pull primary piston assembly straight out to prevent a cylinder inner wall from being damaged.



3. Tap flange using a soft block, such as wood, and carefully pull secondary piston assembly straight out to prevent cylinder body inner wall from being damaged.



BRA0033D

Inspection After Disassembly (Piston Assembly)

Cylinder body

- Check a inner wall of cylinder for damage, abrasions, corrosion, and pinholes. Replace the cylinder body if detected.

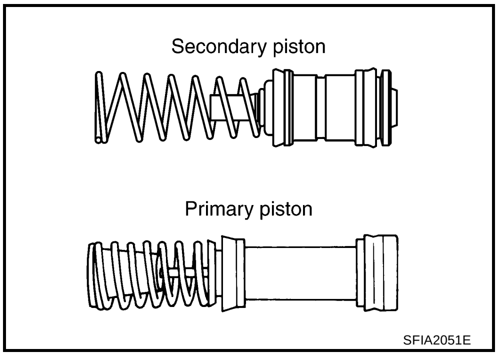
Assembly (Piston Assembly)

CAUTION:

- **Do not use mineral oils such as kerosene, gasoline during cleaning and assembly process.**
- **Make sure there is no foreign matter such as dirt or dust attached to inner cylinder walls, piston, or cup seal, and use care to avoid damaging parts with assembly tools.**
- **Do not drop parts. If a part is dropped, do not use it.**

1. Apply brake fluid to a cylinder inner wall, piston cups and contact surfaces between the piston assemblies. Then insert secondary piston assembly and primary piston assembly into cylinder body in this order.

   CAUTION:
   - **Pay attention to the orientation of piston cup, and insert straight to prevent the cup from being caught by cylinder inner wall.**
   - **Be sure to replace both piston assemblies to new ones in the kit without disassembling.**
   - **Do not reuse primary and secondary piston assemblies.**

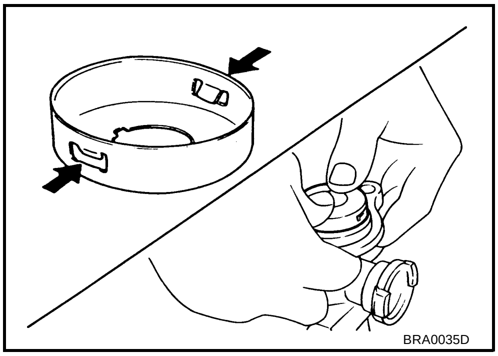


SFIA2051E

2. Holding down the piston with stopper cap, push stopper cap tabs so they are firmly into cylinder grooves, then attach stopper cap.

   CAUTION:

   Do not reuse stopper cap.

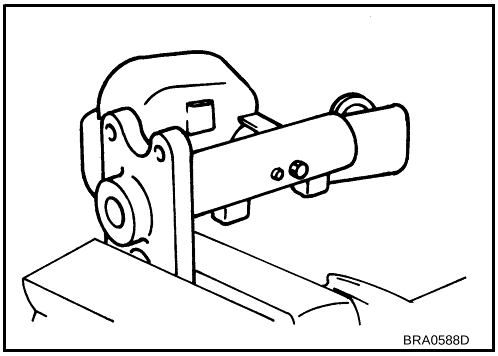


BRA0035D

Disassembly (Reservoir Tank)

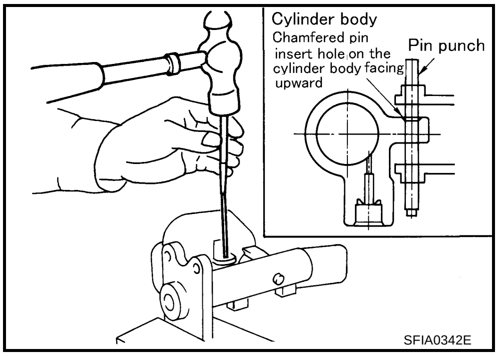
1. Secure master cylinder assembly into a vise with a chamfered pin insert hole on cylinder body facing upward.

   CAUTION:
   - **When securing master cylinder assembly in a vise, be sure not to over-tighten.**
   - **When securing in a vise use copper plates or cloth to protect the flange.**



BRA0588D

2. Using a pin punch [commercial service tool: diameter approximately 4 mm (0.16 in)], remove mounting pin on reservoir tank.
3. Remove master cylinder assembly from a vise.
4. Remove reservoir tank and grommet from cylinder body.



SFIA0342E

Assembly (Reservoir Tank)

1. Apply brake fluid “DOT 3” or rubber lubricant to a grommet, and then install it into cylinder body after installing grommet to reservoir tank.

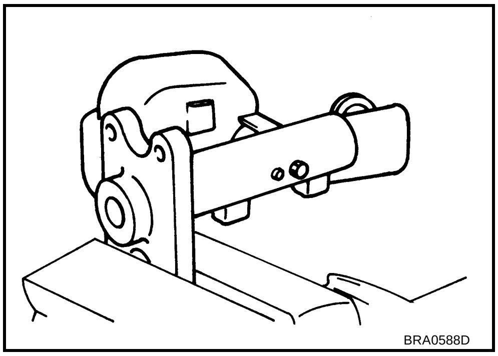
   CAUTION:

   Do not reuse reservoir tank and grommet.

2. Secure master cylinder assembly into a vise with the chamfered pin insert hole on cylinder body facing upward.

   CAUTION:

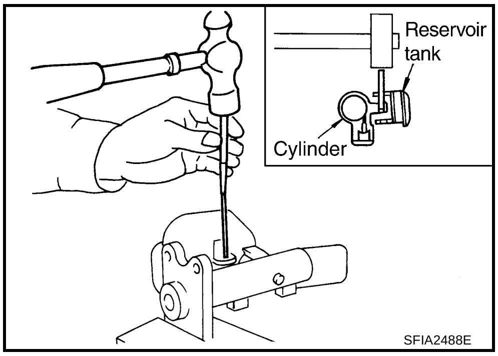
   - **When securing master cylinder assembly in a vise, be sure not to over-tighten.**
   - **When securing in a vise use copper plates or cloth to protect the flange.**


BRA0588D

3. Tilt reservoir tank as shown in the figure for mounting pin to be inserted. Return reservoir tank to a upright position when mounting pin passes through pinhole in cylinder body. Push mounting pin to an opposite pinhole of the reservoir tank, so that it is the same condition as the insertion side.

   CAUTION:

   - **Be sure to insert pin from the chamfered pinhole of cylinder body.**
   - **Do not reuse mounting pin.**



SFIA2488E

MODEL WITH VDC

Disassembly

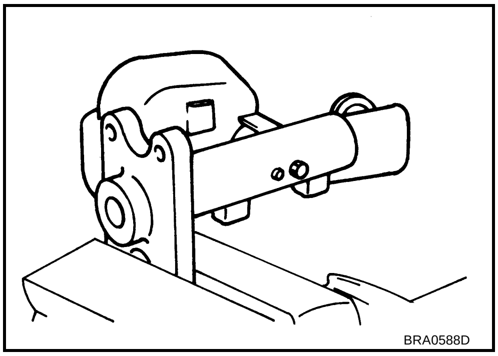
CAUTION:

- **Cover primary piston rod using cloths during disassembly to prevent damage to it.**

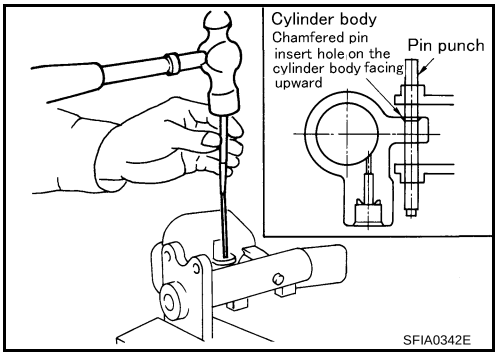
1. Secure master cylinder assembly into a vise with the chamfered pin insert hole on cylinder body facing upward.

   CAUTION:

   - **When securing the master cylinder assembly in a vise, be sure not to over-tighten.**
   - **When securing in a vise use copper plates or cloth to protect the flange.**


BRA0588D

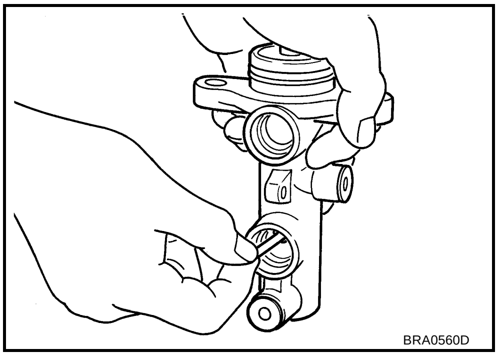
2. Using a pin punch [commercial service tool: diameter approximately 4 mm (0.16 in)], remove mounting pin on the reservoir tank.
3. Remove master cylinder assembly from the vise.
4. Remove reservoir tank and grommet from cylinder body.



SFIA0342E

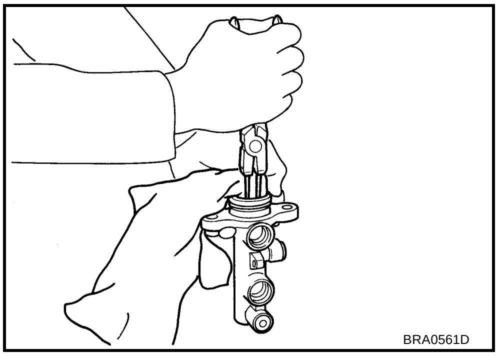
5. Push in primary piston assembly, and then remove piston stopper from cylinder body.

   CAUTION:
   Be careful not to damage an inner wall of cylinder body.

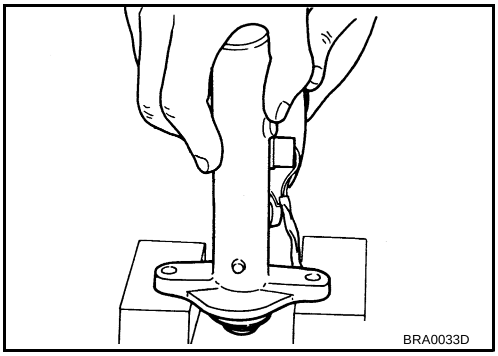

BRA0560D

6. Remove snap ring while pressing in primary piston assembly so as to prevent piston from popping out.

   CAUTION:
   Be careful not to damage an inner wall of cylinder body.
7. Hold primary piston rod, and then pull primary piston assembly, plate, and guide assembly straight out.
8. Remove plate and guide assembly from primary piston assembly.


BRA0561D

9. Tap flange using a soft block, such as wood, and carefully pull secondary piston assembly straight out to prevent a cylinder body inner wall from being damaged.


BRA0033D

Inspection After Disassembly

Cylinder body

- Check an inner wall of cylinder for damage, abrasions, corrosion, and pinholes. Replace cylinder body if detected.

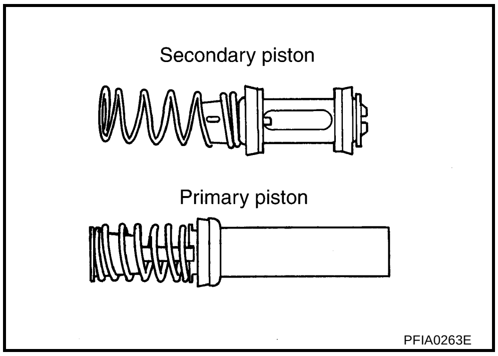
Assembly

CAUTION:

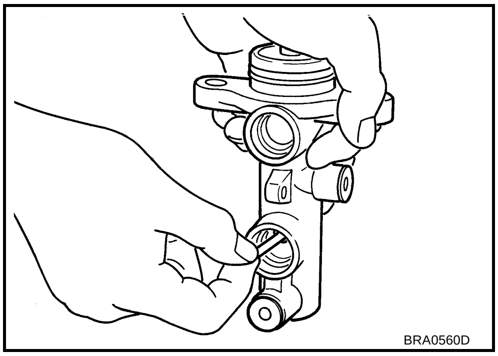
- **Do not use mineral oils such as kerosene, gasoline during cleaning and assembly process.**
- **Make sure there is no foreign matter such as dirt or dust attached to an inner cylinder wall, piston, or piston cup, and use care to avoid damaging parts with the assembly tools.**
- **Do not drop parts. If a part is dropped, do not use it.**

1. Apply brake fluid to cylinder inner wall body and contact surface of the piston assembly. Then insert secondary piston assembly and primary piston assembly into cylinder body.

   CAUTION:
   - **Do not reuse primary and secondary piston assemblies.**
   - **Pay attention to the orientation of piston cup. Also, insert pistons squarely to prevent scratching a cylinder inner wall.**

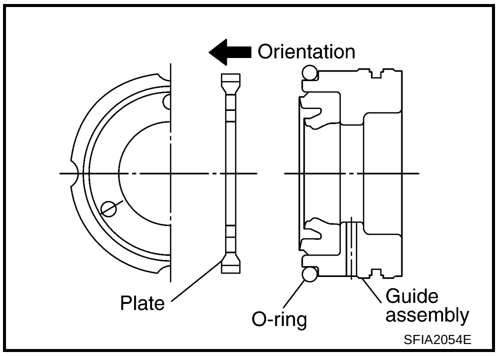


2. Install the piston stopper through a slit of secondary piston, while setting the slit of the piston towards a piston stopper hole of cylinder body. Visually check the secondary piston slit from the piston stopper hole and install the piston stopper.



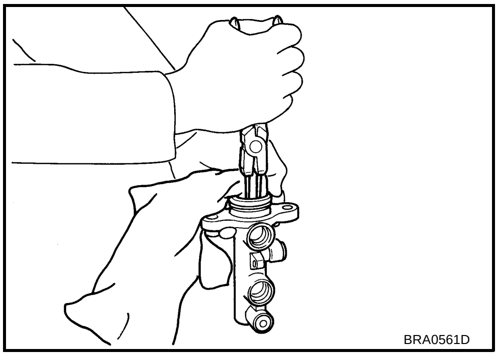
3. Insert plate and guide assembly into the cylinder body as shown.

   CAUTION:
   - **Be careful not to damage primary piston assembly rod.**
   - **Do not drop O-ring.**
   - **Do not tilt plate and guide assembly when inserting.**
   - **Do not reuse guide assembly and plate.**



4. Cover primary piston assembly rod with cloths to prevent damage to it, and then install snap ring when pressing in primary piston assembly.

   CAUTION:
   - **Make sure that snap ring is securely engaged in cylinder body inner diameter groove.**
   - **Do not reuse snap ring.**



5. Apply brake fluid “DOT 3” or rubber lubricant to a grommet, and then install it into reservoir tank.

   CAUTION:

   Do not reuse grommet.

6. Install reservoir tank to cylinder body.

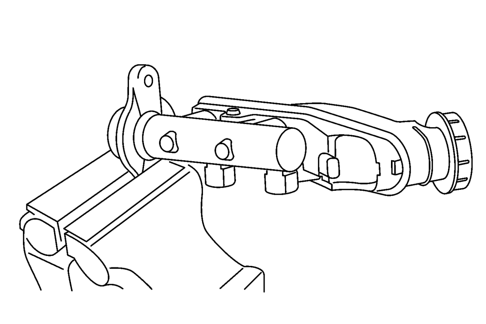
   CAUTION:

   Do not reuse reservoir tank.

7. Secure master cylinder assembly into a vise with a chamfered pin insert hole on cylinder body facing upward.

   CAUTION:

   - **When securing the master cylinder assembly in a vise, be sure not to over-tighten.**
   - **When securing in a vise use copper plates or cloth to protect the flange.**

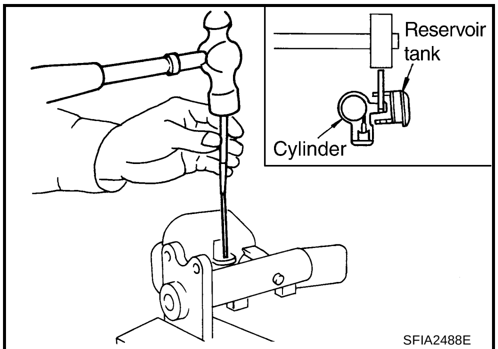


PFIA0505J

8. Tilt reservoir tank as shown in the figure and insert mounting pin. Return reservoir tank to a upright position when mounting pin passes through the pinhole in the cylinder body. Push the mounting pin to the opposite pinhole of the reservoir tank go that it is the same conditions as the insertion side.

   CAUTION:

   - **Be sure to insert pin from a chamfered pinhole of cylinder body.**
   - **Do not reuse mounting pin.**



SFIA2488E

BRAKE BOOSTER

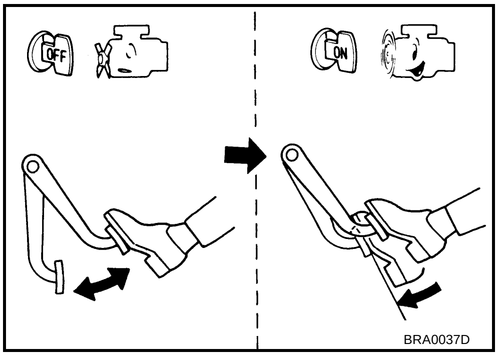
PFP:47200

On-Board Inspection and Service

AFS002KW

OPERATION CHECK

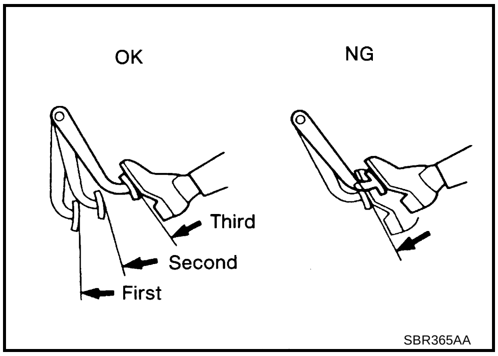
With engine stopped, change vacuum to atmospheric pressure by depressing brake pedal several times. Then with brake pedal fully depressed, start engine and when vacuum pressure reaches the standard, make sure that clearance between brake pedal and floor panel decreases.



BRA0037D

AIR TIGHT CHECK

- Run engine at idle for approximately 1 minute, and stop it after applying vacuum to booster. Depress brake pedal normally to change vacuum to atmospheric pressure. Make sure that distance at intervals of 5 seconds between brake pedal and floor panel gradually increases.
- Depress brake pedal while engine is running, and stop engine with pedal depressed. The pedal stroke should not change after holding pedal down for 30 seconds.

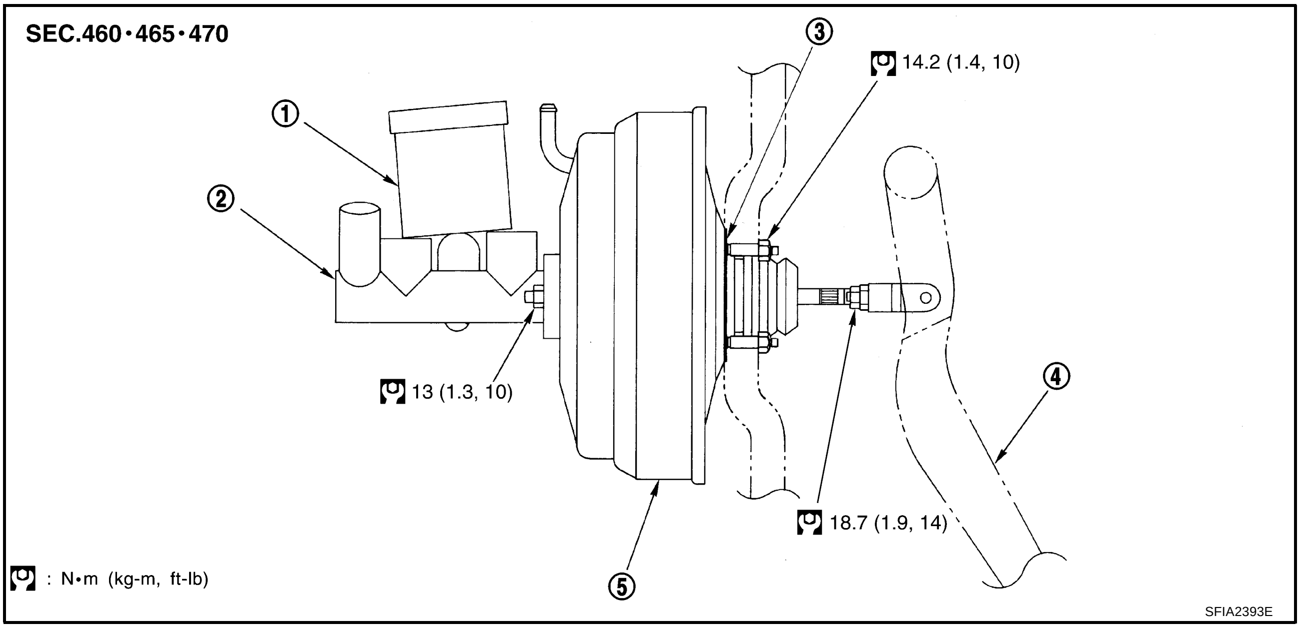


SBR365AA

Removal and Installation

AFS002KX

COMPONENTS



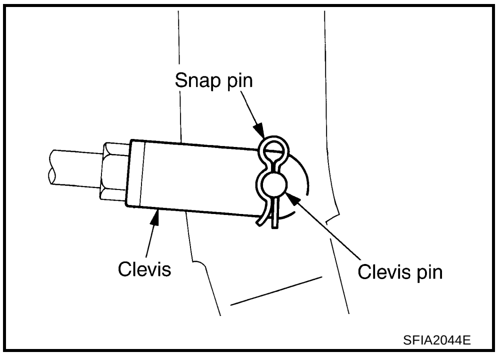
1. Reservoir tank	2. Cylinder body	3. Gasket
4. Brake pedal	5. Brake booster	

CAUTION:

- **Do not deform or bend the brake tube while removing and installing brake booster.**
- **Replace the clevis pin if it is damaged.**
- **Do not damage brake booster stud bolt threads. If brake booster is tilted during installation, the dash panel may damage the threads.**

REMOVAL

1. Remove brake master cylinder. Refer to BR-14, "Removal and Installation" .
2. Remove vacuum hose from brake booster. Refer to BR-24, "Components" .
3. Remove snap pin and clevis pin from inside vehicle.
4. Remove nuts on brake booster and brake pedal assembly.
5. Remove brake booster from dash panel in engine room side.



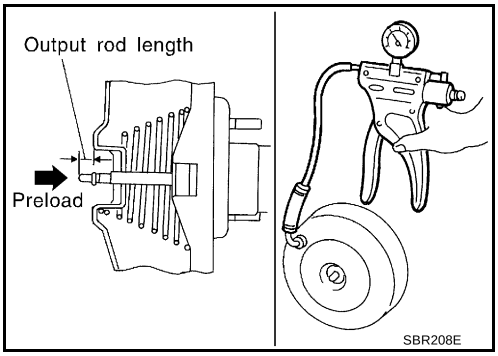
INSPECTION AFTER REMOVAL

Output Rod Length Inspection

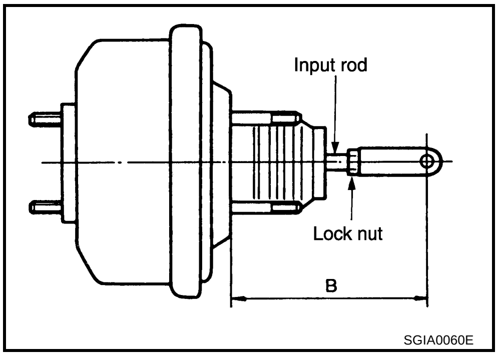
1. Apply a vacuum of –66.7 kPa (–500 mmHg, –19.69 inHg) to brake booster using a handy vacuum pump.
2. Check output rod length.

Standard dimension at a vacuum of –66.7 kPa (–500 mmHg, –19.69 inHg) (Reference value)

Model without VDC	**: 10.4 mm (0.409 in)**
Model with VDC	**: –6.2 mm (–0.244 in)**



INSTALLATION



1. Loosen lock nut to adjust input rod length so that length B (in the figure) satisfies the specified value.

   Length "B" : 125 mm (4.92 in)

2. After adjusting "B", temporarily tighten lock nut to install booster assembly to vehicle. At this time, make sure that a gasket between booster assembly and dash panel is installed.

   CAUTION:
   Always install gasket between brake booster and dash panel.

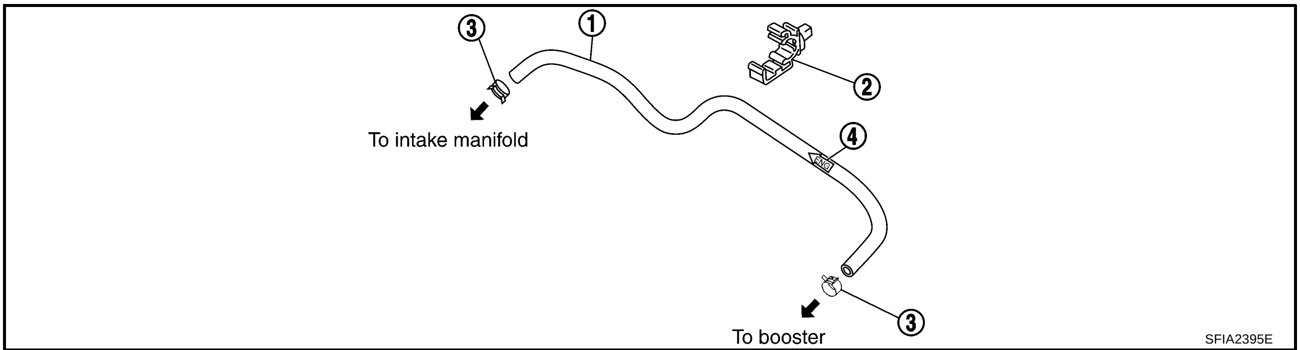
3. Connect brake pedal with clevis of input rod.
4. Install pedal bracket mounting nuts and bolt, and tighten them to the specified torque. Refer to BR-22, "COMPONENTS" .
5. Install master cylinder to booster assembly. Refer to BR-14, "Removal and Installation" .
6. Adjust the pedal height and the play of the brake pedal. Refer to BR-7, "ADJUSTMENT" .
7. Tighten lock nut of input rod to the specified torque. Refer to BR-22, "COMPONENTS" .
8. Refill new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .

VACUUM LINES

PFP:41920

Components

AFS002KY



SFIA2395E

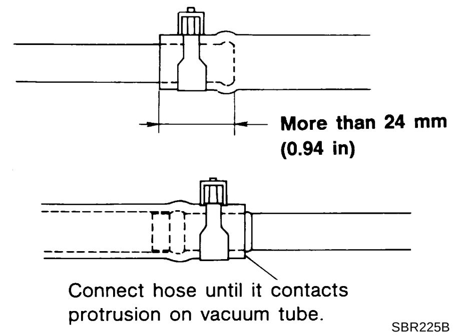
1. Vacuum hose
2. Clip
3. Clamp
4. Engine direction indicator stamp (built in check valve)

Removal and Installation

AFS002KZ

CAUTION:

- **Because vacuum hose contains a check valve, it must be installed in the correct position. Refer to the stamp to confirm correct installation. Brake booster will not operate normally if the hose is installed in the wrong direction.**
- **Insert vacuum hose at least 24 mm (0.94 in).**
- **Do not use lubricating oil during assembly.**



SBR225B

Inspection

AFS002L0

VISUAL INSPECTION

Check for correct assembly, damage and deterioration.

CHECK VALVE INSPECTION

Airtightness Inspection

Use a handy vacuum pump to check.

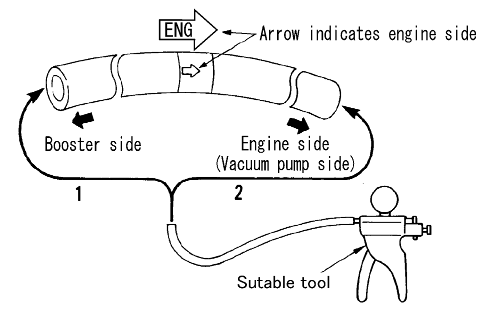
When connected to the booster side (1):

Vacuum should decrease within 1.3 kPa (10 mmHg, 0.39 inHg) for 15 seconds under a vacuum of –66.7 kPa (–500 mmHg, –19.69 inHg).

When connected to the engine side (2):

Vacuum should not exist.

- Replace vacuum hose assembly if vacuum hose and check valve are malfunctioning.



SFIA0210E

FRONT DISC BRAKE

PFP:41000

On-Board Inspection

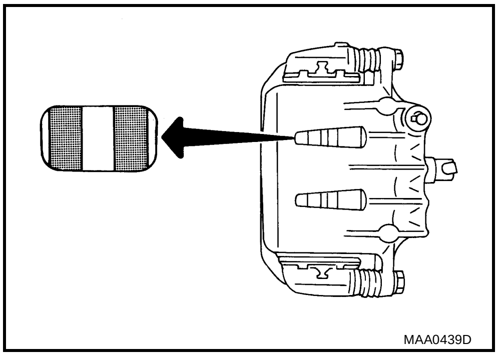
AFS002L1

PAD WEAR INSPECTION

- Check pad thickness from a inspection hole on cylinder body. Check using a scale if necessary.

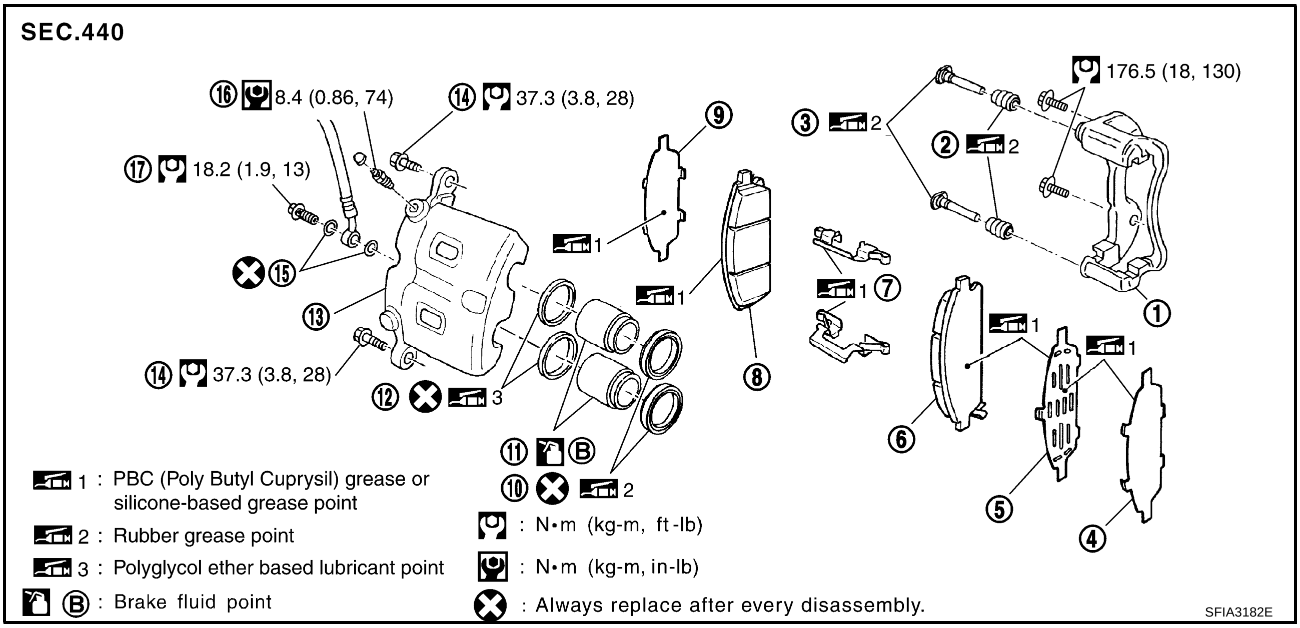
Standard thickness : 11.0 mm (0.433 in)

Repair limit thickness : 2.0 mm (0.079 in)



Components

AFS002L2



1. Torque member	2. Sliding pin boot	3. Sliding pin
4. Outer shim cover	5. Outer shim	6. Outer pad
7. Pad retainer	8. Inner pad	9. Inner shim
10. Piston boot	11. Piston	12. Piston seal
13. Cylinder body	14. Sliding pin bolt	15. Copper washer
16. Bleed valve	17. Union bolt	

WARNING:

Clean dust on caliper and brake pad with a vacuum dust collector to minimize the hazard of air borne particles or other materials.

CAUTION:

- **While removing cylinder body, do not depress brake pedal because piston will pop out.**
- **It is not necessary to remove bolts on torque member and brake hose except for disassembly or replacement of caliper assembly. In this case, hang cylinder body with a wire so as not to stretch brake hose.**
- **Do not damage piston boot.**
- **If any shim is subject to serious corrosion, replace it with a new one.**
- **Always replace shim and shim cover as a set when replacing brake pads.**
- **Keep rotor clean of brake fluid.**

Removal and Installation of Brake Pad

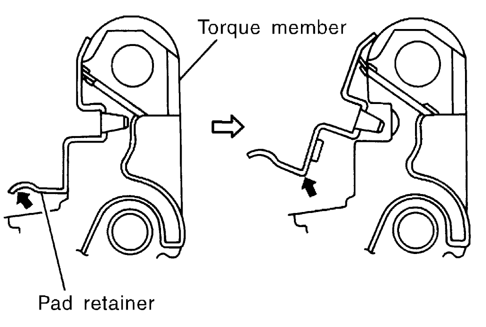
AFS002L3

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove lower sliding pin bolt.
3. Hang cylinder body with a wire, and remove pads, pad retainers, shims, and shim cover from torque member.

   CAUTION:

   Lift pad retainers in the direction by the arrow (shown in the figure) so as not to damage it when removing pad retainers from the torque member.



SBR556E

INSTALLATION

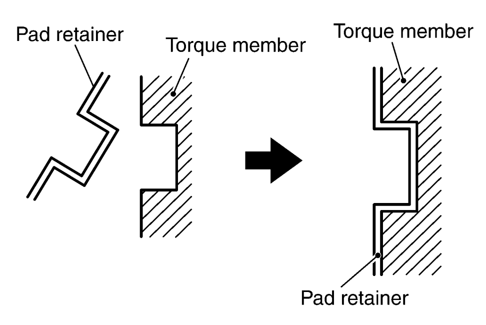
1. Apply PBC (Poly Butyl Cuprysil) or equivalent to between shim cover and shim. Install shim, shim cover, to pad.
2. Apply PBC (Poly Butyl Cuprysil) or equivalent to between pad retainer and pad. Install pad retainers and pads to torque member.

   CAUTION:

   Securely assemble pad retainers so that they are not being lifted up from torque member.
3. Install cylinder body to torque member.

   CAUTION:

   In the case of replacing a pad with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.
4. Install lower sliding pin bolt, and tighten it to the specified torque. Refer to BR-25, "Components" .
5. Check front disc brake for drag.
6. Install tires to vehicle.



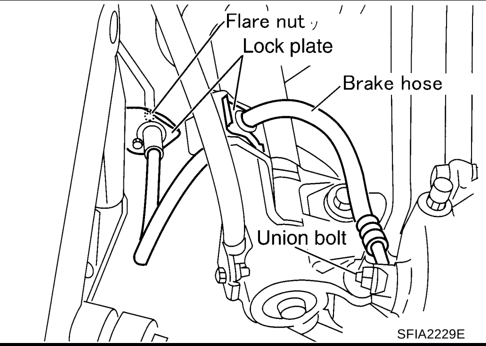
PFIA0273E

Removal and Installation of Brake Caliper Assembly

AFS002L4

REMOVAL

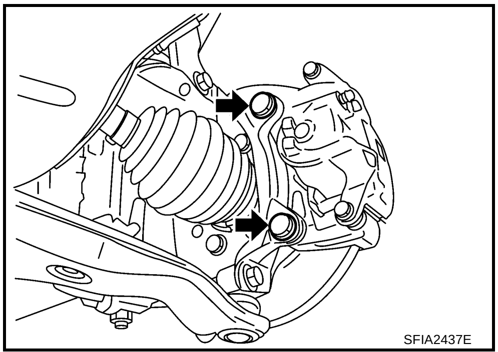
1. Remove tires from vehicle with a power tool.
2. Fasten disc rotor using wheel nut.
3. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
4. Remove union bolt, and then disconnect brake hose from caliper assembly.



SFIA2229E

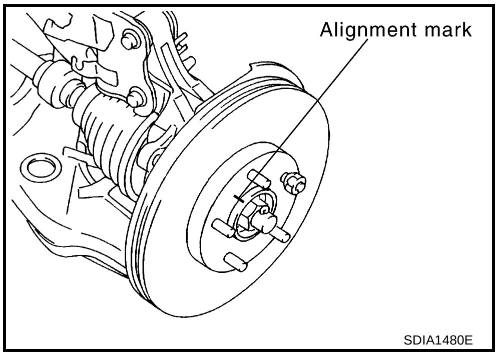
5. Remove torque member bolts, and remove brake caliper assembly.

   CAUTION:
   Do not drop brake pad.


SFIA2437E

6. Remove disc rotor.

   CAUTION:
   Put alignment marks on wheel hub assembly and disc rotor, if it necessary to remove disc rotor.



SDIA1480E

INSTALLATION

CAUTION:

- **Refill with new brake fluid “DOT 3”.**
- **Do not reuse drained brake fluid.**

1. Install disc rotor.

   CAUTION:
   Align the marks of disc rotor and wheel hub put at the time of removal when reusing disc rotor.

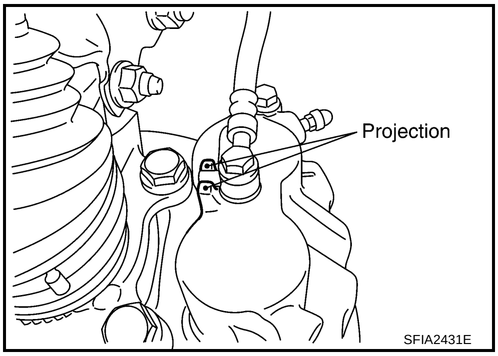
2. Install brake caliper assembly to vehicle, and tighten torque member mounting bolts to the specified torque. Refer to BR-25, "Components" .

   CAUTION:
   Do not allow oil or any moisture on all mating surface between steering knuckle and caliper assembly, bolts, and washer.

3. Install brake hose to brake caliper assembly, and tighten union bolts to the specified torque. Refer to BR-25, "Components" .

   CAUTION:
   - **Do not reuse copper washers for union bolts.**
   - **Connect brake hose aligning with caliper assembly mounting projection.**

4. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .
5. Check front disc brake for drag.
6. Install tires to vehicle.



SFIA2431E

Disassembly and Assembly of Brake Caliper Assembly

AFS002L5

NOTE:
Do not remove torque member, pads, shims, shim covers, and pad retainers when disassembling and assembling cylinder body assembly.

DISASSEMBLY

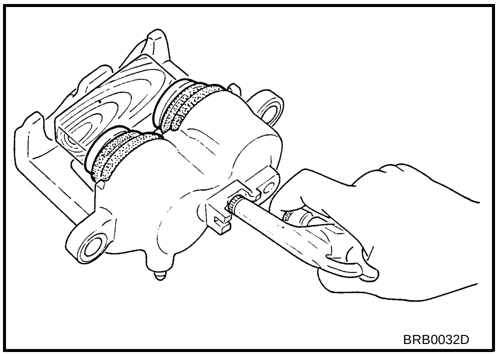
1. Remove sliding pin bolt, and then remove cylinder body from torque member.

   CAUTION:
   Do not drop pads, shims, shim cover and pad retainers from torque member.

2. Remove sliding pins and sliding pin boots from torque member.
3. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove pistons and piston boots.

   CAUTION:

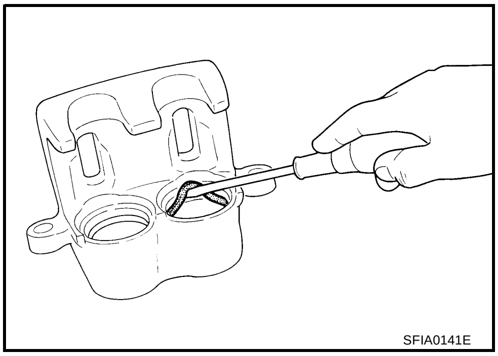
   Do not get fingers caught in the pistons.



4. Remove piston seal from cylinder body using a flat-bladed screwdriver.

   CAUTION:

   Be careful not to damage a cylinder inner wall.



INSPECTION AFTER DISASSEMBLY

Cylinder Body

CAUTION:

- **Clean cylinder body using new brake fluid. Do not use mineral oils such as gasoline or kerosene.**
- **Check a inner wall of the cylinder for wear or damage. Replace the cylinder if any non-standard condition is detected.**

Torque Member

Check torque member for wear, cracks, and damage. Replace if there are.

Piston

CAUTION:

- **Check a piston surface for corrosion, wear, and damage. Replace if there are.**
- **A piston sliding surface is plated. Do not polish with sandpaper.**

Sliding Pin, Sliding Pin Bolt, and Sliding Pin Boot

Check sliding pin, sliding pin bolt, and sliding pin boot for wear, damage, and cracks. Replace if there are.

ASSEMBLY

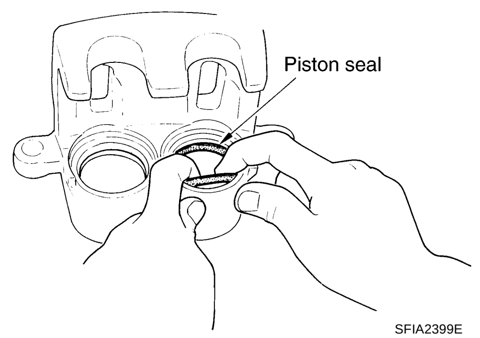
CAUTION:

When assembling, use only rubber lubricant specified below.

1. Apply polyglycol ether based lubricant to piston seal, and install them to cylinder body.

   CAUTION:

   Do not reuse piston seal.

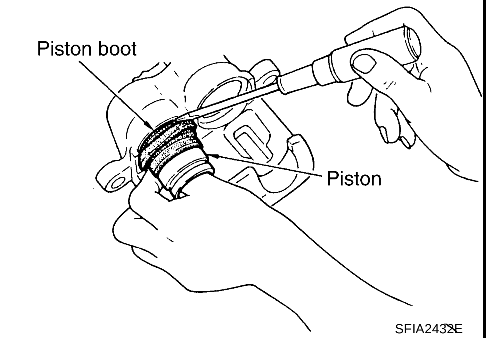


SFIA2399E

2. Apply rubber grease to piston boot. Cover the piston end with piston boot, and then install cylinder side lip on piston boot securely into a groove on cylinder body.

   CAUTION:

   Do not reuse piston boot.



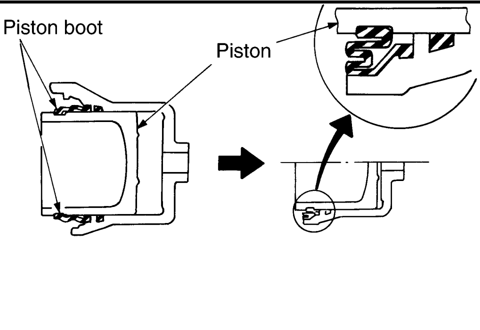
SFIA2432E

3. Apply brake fluid to piston. Insert into cylinder body by hand and insert piston boot piston-side lip into the piston groove.

   CAUTION:

   Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.

4. Install sliding pins and sliding pin boots to torque member.



SFIA2279E

5. Install torque member to steering knuckle, and tighten mounting bolts to the specified torque. Refer to BR-25, "Components" .

   CAUTION:

   Do not allow oil or any moisture on all contact surfaces between steering knuckle and brake caliper assembly.

6. Press in piston until pads can be installed, and then install cylinder body to torque member.

   NOTE:

   Use a disc brake piston tool (commercial service tool) to easily press piston in.

7. Tighten sliding pin bolts to the specified torque. Refer to BR-25, "Components" .

DISC ROTOR INSPECTION

Visual Inspection

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

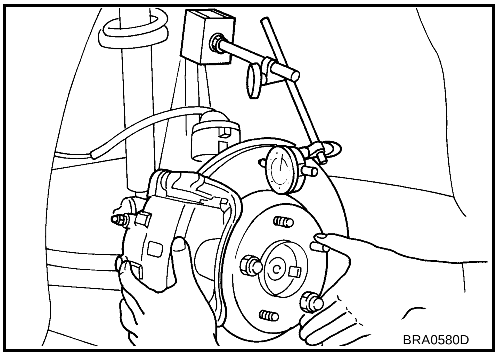
Runout Inspection

1. Fix disc rotor to wheel hub using wheel nuts (2 or more positions).
2. Inspect runout using a dial gauge. [Measured at 10 mm (0.39 in) inside the disc edge.]

   Runout limit : 0.06 mm (0.0024 in)

   (with it attached to the vehicle)

   NOTE:
   Before measuring, make sure wheel bearing axial end play is within the specification before measuring runout. Refer to FAX-7, "WHEEL BEARING INSPECTION" .



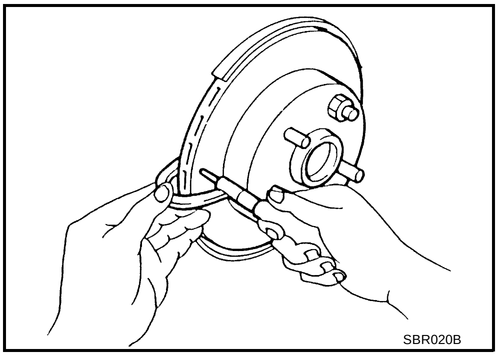
3. When runout exceeds limit value, displace mounting positions of disc rotor by one hole. And then find a position of the minimum value for runout.
4. Replace or lathe disc rotor if runout is outside the specified value after performing the above operation. (“MAD DL-8700”, “AMMCO 700 and 705” or equivalent.)

Thickness Inspection

Check thickness of the disc rotor using a micrometer. Replace disc rotor if thickness is under the wear limit.

Standard thickness : 28.0 mm (1.102 in)

Wear limit : 26.0 mm (1.024 in)



BRAKE BURNISHING PROCEDURE

Burnish contact surfaces between disc rotors and pads according to following procedure after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

CAUTION:

- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive vehicle on straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

REAR DISC BRAKE

PFP:44000

On-Board Inspection

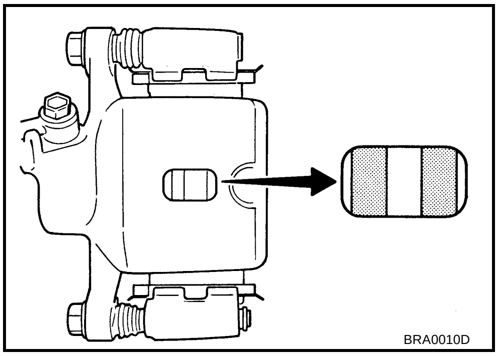
AFS002L6

PAD WEAR INSPECTION

- Check pad thickness from a inspection hole on cylinder body. Check using a scale if necessary.

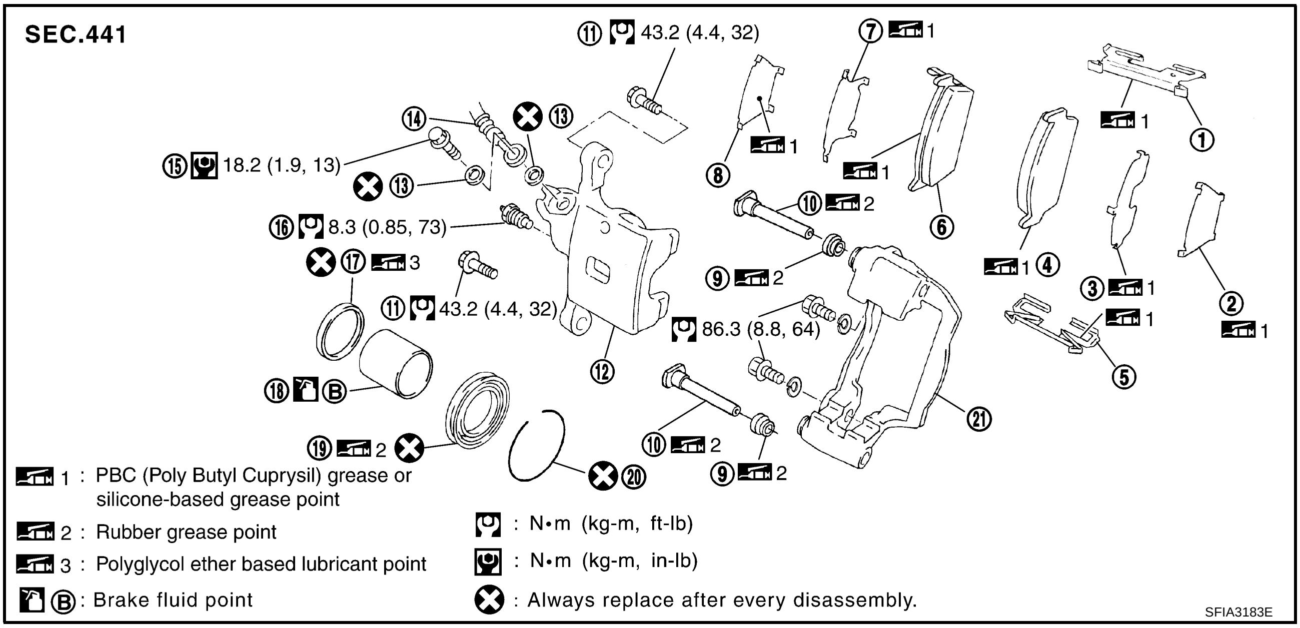
Standard

Standard thickness	:	**8.5 mm (0.335 in)**
Repair limit thickness	:	**2.0 mm (0.079 in)**



Components

AFS002L7



1.	Pad retainer	2.	Outer shim cover	3.	Outer shim
4.	Outer pad	5.	Pad retainer	6.	Inner pad
7.	Inner shim	8.	Inner shim cover	9.	Sliding pin boot
10.	Sliding pin	11.	Sliding pin bolt	12.	Cylinder body
13.	Copper washer	14.	Brake hose	15.	Union bolt
16.	Bleed valve	17.	Piston seal	18.	Piston
19.	Piston boot	20.	Retaining ring	21.	Torque member

WARNING:

Clean dust on caliper and brake pad with a vacuum dust collector to minimize the hazard of air borne particles or other materials.

CAUTION:

- **While removing cylinder body, do not depress brake pedal because piston will pop out.**
- **It is not necessary to remove bolts on torque member and brake hose except for disassembly or replacement of caliper assembly. In this case, hang cylinder body with a wire so as not to stretch brake hose.**
- **Do not damage piston boot.**
- **If any shim is subject to serious corrosion, replace it with a new one.**
- **Always replace shim and shim covers as a set when replacing brake pads.**
- **Keep rotor clean of brake fluid.**

Removal and Installation of Brake Pad

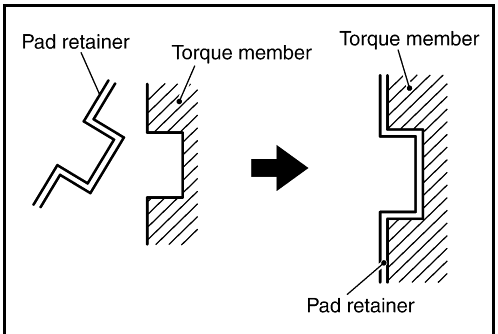
AFS002L8

REMOVAL

1. Remove tires from vehicle with a power tool.
2. Remove upper sliding pin bolt.
3. Hang cylinder body with a wire. Remove pads, pad retainers and shims, and shim covers from torque member.

INSTALLATION

1. Apply PBC (Poly Butyl Cuprysil) or equivalent to between shim cover and shim. Install inner shim, inner shim cover to inner pad, and outer shim, outer shim cover to outer pad.
2. Apply PBC (Poly Butyl Cuprysil) or equivalent to between pad retainer and pad. Install pad retainers and pads to torque member.



PFIA0273E

3. Press in piston until pads can be installed, and then install cylinder body to torque member.

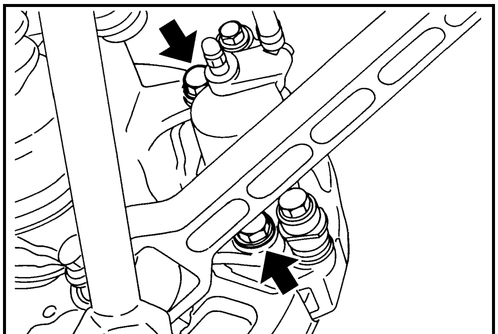
   CAUTION:
   In the case of replacing pad with new one, check a brake fluid level in the reservoir tank because brake fluid returns to master cylinder reservoir tank when pressing piston in.
4. Install upper sliding pin bolt and tighten to the specified torque. Refer to BR-31, "Components" .
5. Fasten disc rotor with a wheel nut. Put a foot on brake pedal a few times until it gets a responsive touch.
6. Check rear disc brake for drag.
7. Install tires to vehicle.

Removal and Installation of Brake Caliper Assembly

AFS002L9

REMOVAL

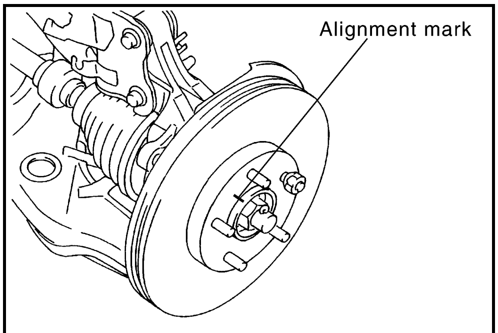
1. Remove tires from vehicle with a power tool.
2. Fasten disc rotor using wheel nut.
3. Drain brake fluid. Refer to BR-9, "Drain and Refill" .
4. Remove union bolt and then disconnect brake hose from caliper assembly.


SFIA0143E

5. Remove torque member bolts, and remove brake caliper assembly.

   CAUTION:
   Do not drop brake pad.
6. Remove disc rotor.

   CAUTION:
   Put alignment marks on wheel hub assembly and disc rotor, if it necessary to remove disc rotor.



SDIA1480E

INSTALLATION

CAUTION:

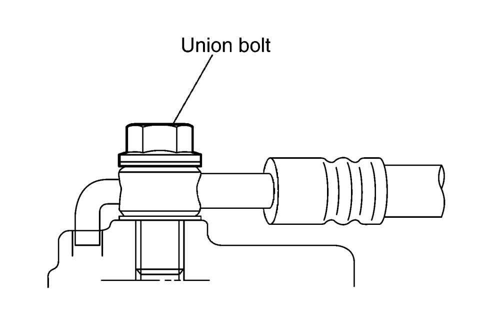
- **Refill with new brake fluid “DOT 3”.**
- **Do not reuse drained brake fluid.**

1. Install disc rotor.

   CAUTION:
   Align the marks of disc rotor and wheel hub put at the time of removal when reusing disc rotor.
2. Install brake caliper assembly vehicle, and tighten torque member mounting bolts to the specified torque.

   CAUTION:
   Before installing caliper assembly, wipe off oil and moisture on all mounting surfaces of rear axle and caliper assembly and threads, bolts and washers.
3. Install L-shaped pin of brake hose and then tighten union bolt to the specified torque.

   CAUTION:
   Do not reuse copper washer for union bolt.
4. Refill with new brake fluid and bleed air. Refer to BR-10, "Bleeding Brake System" .
5. Check rear disc brake for drag.
6. Install tires to the vehicle.



SFIA2049E

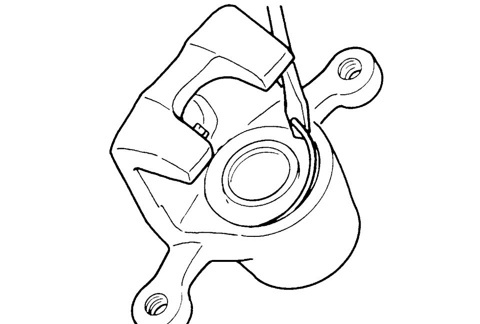
Disassembly and Assembly of Brake Caliper Assembly

AFS002LA

NOTE:
Do not remove torque member, pads, shims, shim covers, and pad retainers when disassembling and assembling cylinder body assembly.

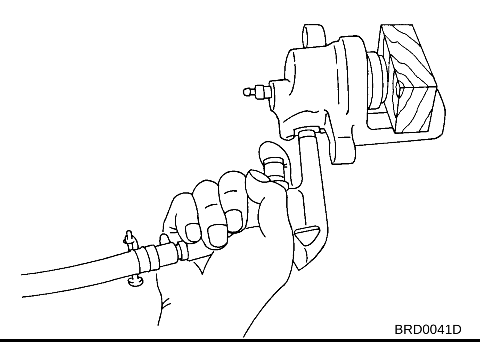
DISASSEMBLY

1. Remove sliding pin bolt, and then remove cylinder body from torque member.
2. Remove sliding pin boot from torque member.
3. Remove retaining ring from cylinder body using a flat-bladed screwdriver as shown in the figure.


SBR028A

4. Place a wooden block as shown in the figure, and blow air from union bolt mounting hole to remove piston and piston boot.

   CAUTION:
   Do not get fingers caught in the piston.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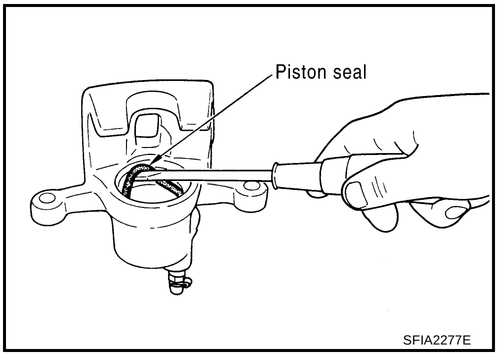
5. Remove piston seal from cylinder body using a flat-bladed screwdriver.

   CAUTION:
   Be careful not to damage cylinder inner wall.



INSPECTION AFTER DISASSEMBLY

Cylinder Body

CAUTION:

- **Clean cylinder body using new brake fluid. Do not use mineral oils such as gasoline or kerosene.**
- **Check a inner wall of the cylinder for wear or damage. Replace the cylinder if any non-standard condition is detected.**

Torque Member

Check torque member for wear, cracks, and damage. Replace if there are.

Piston

CAUTION:

- **Check a piston surface for corrosion, wear, and damage. Replace if there are.**
- **A piston sliding surface is plated. Do not polish with sandpaper.**

Sliding pin,Sliding Pin Bolt, Sliding Pin Boot

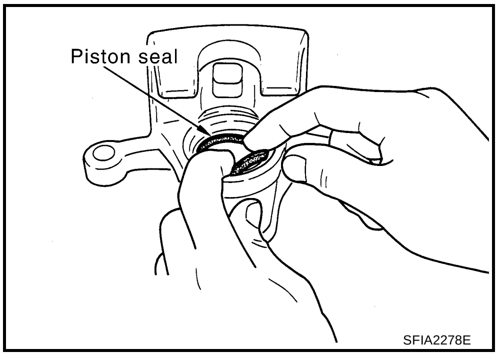
Check sliding pin,sliding pin bolt and sliding pin boot for wear, damage, and cracks. Replace if there are.

ASSEMBLY

CAUTION:
When assembling, use only rubber lubricant specified below.

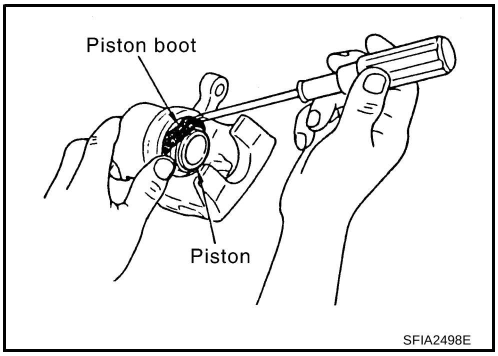
1. Apply polyglycol ether based lubricant to piston seal, and install them to cylinder body.

   CAUTION:
   Do not reuse piston seal.



2. Apply rubber grease to piston boot. Cover the piston end with the piston boot, and then install cylinder side lip on the piston boot securely into the groove on cylinder body.

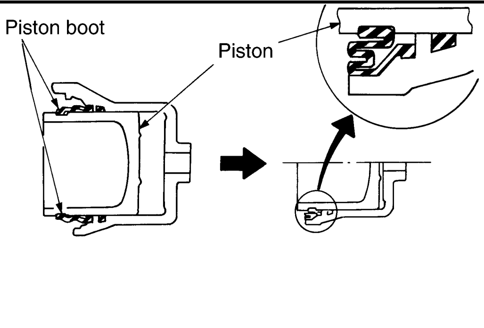
   CAUTION:
   Do not reuse piston boot.



3. Apply brake fluid to piston. Insert into cylinder body by hand and insert piston boot piston side lip into the piston groove.

   CAUTION:

   Press the piston evenly and vary the pressing point to prevent cylinder inner wall from being rubbed.



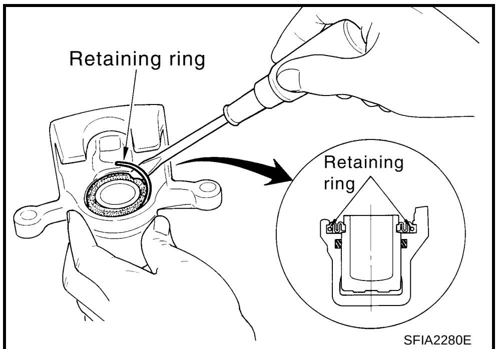
SFIA2279E

4. Fix piston boot with retaining ring.

   CAUTION:

   - **Make sure that boot is securely engaged in the groove on cylinder body.**
   - **Do not reuse retainer ring.**

5. Install sliding pin boot to torque member.
6. Install the cylinder body to torque member, and then tighten sliding pin bolt to the specified torque.



SFIA2280E

DISC ROTOR INSPECTION

Visual Inspection

Check surface of disc rotor for uneven wear, cracks, and serious damage. Replace if there are.

Runout Inspection

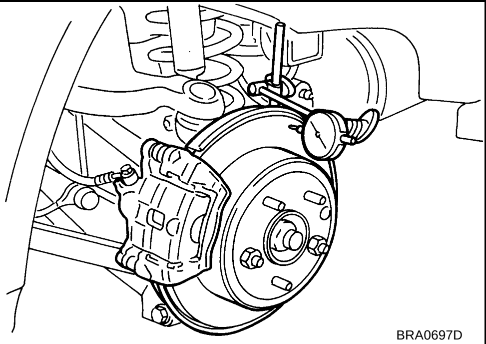
1. Fix disc rotor to wheel hub using wheel nuts (2 or more positions).
2. Inspect runout using dial gauge. [Measured at 10 mm(0.39 in) inside disc edge.]

   Runout limit (with it attached to the vehicle)

   : 0.1 mm (0.0039 in)

   NOTE:

   Before measuring, make sure that wheel bearing axial end play is within the specification. Refer to RAX-5, "WHEEL BEARING INSPECTION" , RAX-15, "WHEEL BEARING INSPECTION" .

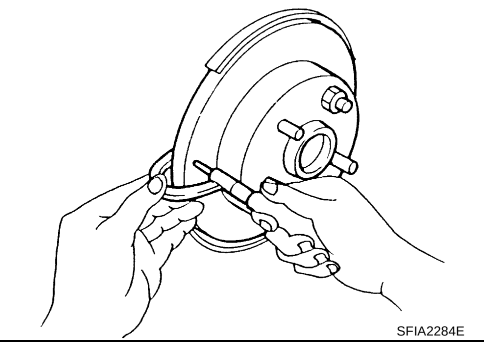

BRA0697D

3. When runout exceeds limit value, displace mounting position of disc rotor by one hole. And then find a position of the minimum value for runout.
4. Replace disc rotor if it is outside repair limit after performing the above operation.

Thickness Inspection

Check the thickness of the disc rotor using a micrometer. Replace disc rotor if the thickness is under the wear limit.

Standard thickness	**: 16.0 mm (0.631 in)**
Wear limit	**: 14.0 mm (0.551 in)**


SFIA2284E

BRAKE BURNISHING PROCEDURE

Burnish contact surfaces between disc rotors and pads according to following procedure after refinishing or replacing rotors, after replacing pads, or if a soft pedal occurs at very low mileage.

CAUTION:

- **Be careful of vehicle speed because the brake does not operate easily until pad and disc rotor are securely fitted.**
- **Only perform this procedure under safe road and traffic conditions. Use extreme caution.**

1. Drive the vehicle on a straight, flat road.
2. Depress brake pedal with the power to stop vehicle within 3 to 5 seconds until the vehicle stops.
3. Drive without depressing brake for a few minutes to cool the brake.
4. Repeat steps 1 to 3 until pad and disc rotor are securely fitted.

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

General Specifications

AFS002LB

Unit: mm (in)

Front brake	Brake model		AD31VD
	Cylinder bore diameter		44.4 × 2 (1.748 × 2)
	Pad length × width × thickness		132.0 × 52.5 × 11.0 (5.20 × 2.067 × 0.433)
	Rotor outer diameter × thickness		280 × 28 (11.02 × 1.10)
Rear brake	Brake model		AD9VA
	Cylinder bore diameter		34.93 (1.375)
	Pad length × width × thickness		83.0 × 33.0 × 8.5 (3.268 × 1.299 × 0.335)
	Rotor outer diameter × thickness		292 × 16 (11.50 × 0.63)
Master cylinder	Cylinder bore diameter		25.4 (1)
Control valve	Valve model		Electric brake force distribution
Brake booster	Booster model		C215T
	Diaphragm diameter	Primary	230 (9.06)
		Secondary	205 (8.07)
Recommended brake fluid			DOT 3

Brake Pedal

AFS002LC

Brake pedal height (from dash lower panel top surface)	M/T model	156 – 166 mm (6.14 – 6.54 in)
	A/T model	164 – 174 mm (6.46 – 6.85 in)
Depressed pedal height [under a force of 490 N (50 kg, 110 lb) with engine running]	M/T model	80 mm (3.15 in) or more
	A/T model	85 mm (3.35 in) or more
Clearance between stopper rubber and threaded end of the stop lamp switch and ASCD cancel switch		0.74 - 1.96 mm (0.0291 - 0.0772 in)
Pedal play		3 - 11 mm (0.12 - 0.43 in)

Brake Booster

AFS002LD

Vacuum type

Input rod installation standard dimension	125 mm (4.92 in)

Check Valve

AFS002LE

Vacuum leakage [at vacuum of – 66.7 kPa (– 500 mmHg, – 19.69 inHg)]	Within 1.3 kPa (10 mmHg, 0.39 inHg) of vacuum for 15 seconds

Front Disc Brake

AFS002LF

Brake model		AD31VD
Brake pad	Standard thickness (new)	11.0 mm (0.433 in)
	Repair limit thickness	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	28.0 mm (1.102 in)
	Repair limit thickness	26.0 mm (1.024 in)
	Maximum runout (with it attached to the vehicle)	0.06 mm (0.0024 in)

Rear Disc Brake

AFS002LG

Brake model		AD9VA
Brake pad	Standard thickness (new)	8.5 mm (0.335 in)
	Repair limit thickness	2.0 mm (0.079 in)
Disc rotor	Standard thickness (new)	16.0 mm (0.631 in)
	Repair limit thickness	14.0 mm (0.551 in)
	Maximum runout (with it attached to the vehicle)	0.1 mm (0.0039 in)